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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/780,372	02/17/2004	Geetani R. Edirisooriya	42.P18943	1824

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EXAMINER

KING, JUSTIN

ART UNIT	PAPER NUMBER
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2111

DATE MAILED: 02/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/780,372	Applicant(s) EDIRISOORIYA ET AL.	
	Examiner Justin I. King	Art Unit 2111	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 July 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 8-16 and 19-27 is/are rejected.
- 7) ☒ Claim(s) 5-7 and 17-18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7/26/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Method and apparatus for managing buffers in PCI bridges".

Drawings

2. Figures 2, 3, and 3a should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
3. The figure 4 is objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) without the structure number as mentioned in the description. The Specification paragraph 55 discloses a virtual buffer 404 in figure 4. The figure 4 discloses a virtual buffer without the structure number. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Eskandari et al. (U.S. Patent No. 6,260,096).

Referring to claim 1: Eskandari discloses receiving a read request from a PCI (Peripheral Component Interconnect) agent coupled to a PCI bridge (figure 2, step 202); allocating a pre-fetch buffer for the delayed transaction (column 2, lines 58-60 and 67, column 3, lines 1-3); setting a buffer fill watermark for the pre-fetch buffer; transferring data into the pre-fetch buffer while monitoring a fill level of the pre-fetch buffer; and enabling data to be transferred from the pre-fetch buffer to the PCI agent once the fill level of the pre-fetch buffer meets or exceeds the buffer fill watermark (column 3, last paragraph, column 4, line 1). Hence, claim 1 is anticipated by Eskandari.

Referring to claim 2: Eskandari discloses a configuration register on the PCI bridge to set the buffer fill watermark (column 4, lines 3-4).

Referring to claim 3: Eskandari discloses that the optimal amount of read data before any data delivery is determined by the data traffic (column 4, lines 9-14); which is the claimed determining a buffer fill watermark value by observing data transfer rates of the PCI agent when different watermarks are used.

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Referring to claim 4: Eskandari discloses a user programmable register (column 4, lines 3-4) for dynamically setting the buffer fill watermark value.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1-4, 8-16, and 19-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Eskandari.

Referring to claim 1: The admitted prior art discloses receiving a read request from a PCI (Peripheral Component Interconnect) agent coupled to a PCI bridge; allocating a pre-fetch buffer for the delayed transaction; transferring data into the pre-fetch buffer; and enabling data to be transferred from the pre-fetch buffer to the PCI agent (figure 4). The admitted prior art does not disclose setting a buffer fill watermark for the pre-fetch buffer and transferring data once the fill level of the pre-fetch buffer meets or exceeds the buffer fill watermark.

Eskandari discloses setting a buffer fill watermark for the pre-fetch buffer, transferring data into the pre-fetch buffer while monitoring a fill level of the pre-fetch buffer; and enabling data to be transferred from the pre-fetch buffer to the PCI agent once the fill level of the pre-fetch buffer meets or exceeds the buffer fill watermark (column 3, last paragraph, column 4, line 1). Eskandari teaches one to improve the latency in a PCI delay transaction by setting a threshold on the buffer (column 1, last 2 lines, column 2, lines 1-4). Hence, it would have been obvious to one having ordinary skill in the computer art to adapt Eskandari at the time Applicant made the invention because Eskandari teaches one to improve the latency in a PCI delay transaction by setting a threshold on the buffer.

Referring to claim 2: Eskandari discloses a configuration register on the PCI bridge to set the buffer fill watermark (column 4, lines 3-4).

Referring to claim 3: Eskandari discloses that the optimal amount of read data before any data delivery is determined by the data traffic (column 4, lines 9-14); which is the claimed determining a buffer fill watermark value by observing data transfer rates of the PCI agent when different watermarks are used.

Referring to claim 4: Eskandari discloses a user programmable register (column 4, lines 3-4) for dynamically setting the buffer fill watermark value.

Referring to claims 8-9, 15-16, and 22-23: The admitted prior art discloses receiving first and second data transfer requests from a multi-channel PCI (Peripheral Component Interconnect) device, the first data transfer request corresponding to a first channel, the second data transfer request corresponding to a second channel; initiating respective first and second delayed transactions corresponding to the first and second data transfer requests at a PCI bridge; setting

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up a first pre-fetch buffer corresponding to the first delayed transaction, setting up a second pre-fetch buffer corresponding to the second delayed transaction, that pre-fetch buffer being a first filled buffer; and in response thereto, connecting the multi-channel PCI device to the PCI bridge; mapping a virtual buffer to the first filled buffer; transferring data from the first filled buffer to multi-channel PCI device until the first filled buffer is empty; and disconnecting the multi-channel PCI device from the PCI bridge (figure 4, Specification, paragraphs 48-57). Since each PCI transaction read request includes a memory location for reading, each request implicitly includes a size of the transferred data. The admitted prior art does not explicitly disclose the buffer fill watermark.

Eskandari discloses setting a buffer fill watermark for the pre-fetch buffer, transferring data into the pre-fetch buffer while monitoring a fill level of the pre-fetch buffer; and enabling data to be transferred from the pre-fetch buffer to the PCI agent once the fill level of the pre-fetch buffer meets or exceeds the buffer fill watermark (column 3, last paragraph, column 4, line 1). Eskandari teaches one to improve the latency in a PCI delay transaction by setting a threshold on the buffer (column 1, last 2 lines, column 2, lines 1-4). Hence, it would have been obvious to one having ordinary skill in the computer art to adapt Eskandari at the time Applicant made the invention because Eskandari teaches one to improve the latency in a PCI delay transaction by setting a threshold on the buffer.

Referring to claims 10-11 and 25-26: The admitted prior art discloses a mass storage controller (Specification, paragraph 55). Furthermore, an Office Notice is taking as the following: a PCI mass storage controller/SCSI controller is a well-known device in the computer industry.

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Referring to claim 12: The admitted prior art discloses a plurality of the buffers, which are for storing the transferring data to the multi-channel PCI device.

Referring to claims 13-14, 19-20, and 27: The admitted prior art discloses the PCI bridge (Specification, paragraph 54). Furthermore, an Official Notice is taking on the following: both the host -to-PCI bridge and the PCI-to-PCI bridge are well-known chipset components in a computer system.

Referring to claims 21 and 24: Eskandari discloses a user programmable register (column 4, lines 3-4) for dynamically setting the buffer fill watermark value.

Allowable Subject Matter

9. Claims 5-7, 17-18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Referring to claim 5: The prior arts on record do not disclose or explicitly teaches the subsequent read requests having a starting address corresponding to a remaining portion of the data that has yet to be received by the PCI agent.

Referring to claims 6-7: Claims are allowable because they incorporate the parent claim's allowable subject matters.

Referring to claim 17: The prior arts on record do not disclose or explicitly teaches determining whether a size of the subsequent read request is less than the first buffer fill

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watermark, and in response thereto, setting the second buffer fill watermark equal to the size of the subsequent read request.

Referring to claim 18: Claim is allowable because they incorporate the parent claim's allowable subject matters.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin I. King whose telephone number is 571-272-3628. The examiner can normally be reached on Monday through Friday, 9:00 am to 5:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rehana Perveen can be reached on 571-272-3676 or on the central telephone number, (571) 272-2100. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

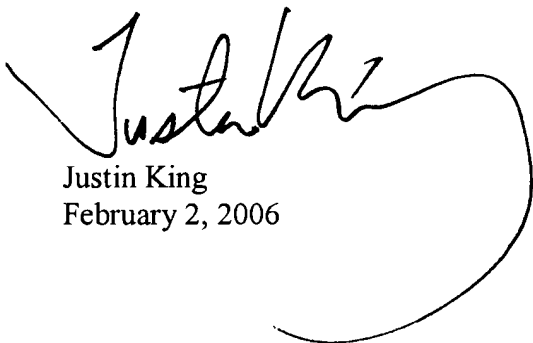
Lastly, paper copies of cited U.S. patents and U.S. patent application publications will cease to be mailed to applicants with Office actions as of June 2004. Paper copies of foreign patents and non-patent literature will continue to be included with office actions. These cited

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U.S. patents and patent application publications are available for download via the Office's PAIR. As an alternate source, all U.S. patents and patent application publications are available on the USPTO web site (www.uspto.gov), from the Office of Public Records and from commercial sources. Applicants are referred to the Electronic Business Center (EBC) at <http://www.uspto.gov/ebc/index.html> or 1-866-217-9197 for information on this policy. Requests to restart a period for response due to a missing U.S. patent or patent application publications will not be granted.



Khanh Dang
Primary Examiner



Justin King
February 2, 2006